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REMARKS

Claims 1, 3-20 and 24-26 are pending in the application. Claim 3 has been amended herein to provide proper dependency. Claims 24-26 have been newly added and are directed to the particular shape of the protrusions. Support for such claims is found, for example, at page 15, lines 20-22 of the application. Favorable reconsideration of the entire application, as amended, is respectfully requested.

Applicants acknowledge the withdrawal of the previous grounds for rejection. Applicants further note with appreciation the Examiner's continued careful examination of the application.

I. OBJECTION TO CLAIM 3

Claim 3 is objected to as being dependent from a canceled claim. Claim 3 has been amended herein to correct the informality.

II. REJECTION OF CLAIMS 12-14 UNDER 35 USC §112, 2nd ¶

Claims 12-14 are rejected under 35 USC §112, second paragraph, as being indefinite. Withdrawal of the rejection is respectfully requested for at least the following reasons.

Specifically, the Examiner indicates it is unclear what the tilted and/or twisted protrusions are in the invention. The Examiner argues that the specification does not define those tilted and/or twisted protrusions.

Applicants note that the specification does discuss tilted and twisted protrusions. (See, e.g. Spec. page 14, lines 4-24; page 13, lines 1-5, respectively). While the application does not describe in great detail tilted and twisted protrusions, the application does provide several examples by way of the materials which may serve as the protrusions. A person having ordinary skill in the relevant technology would know what is meant by tilted and twisted by way of the examples presented.

For example, those having ordinary skill in the art would understand that "tilted" and "twisted" refer to the molecular orientation of the material used to make the protrusions. "Twisted" materials are composed of molecules provided in a twisted state

(as exemplified in Fig. 4), and "tilted" materials are composed of molecules provided in a tilted state (as exemplified in Fig. 5). Those having ordinary skill in the art would further understand "twisted" and "tilted" by virtue of the exemplary polymers disclosed in the application, e.g., diacrylate RM257:monoacrylate RM308 (tilted) and reactive mesogen RM257 doped with 1.2% CB15 (twisted).

Accordingly, withdrawal of the rejection is respectfully requested.

III. REJECTION OF CLAIMS 1, 3-10, 12-17, 19 AND 20 UNDER 35 USC §103(a)

Claims 1, 3-10, 12-17, 19 and 20 stand rejected under 35 USC § 103(a) based on *Acosta et al.* in view of the newly cited *Funada et al.* Withdrawal of this rejection is respectfully requested for at least the following reasons.

The Examiner now relies on *Funada et al.* as teaching the desirability of providing anisotropic protrusions which have a height which is at least 10% of the thickness of the liquid crystal as recited in claim 1. The Examiner refers to how *Funada et al.* teaches protrusions having a height up to 1 micron (see e.g., column 2, lines 61-66). The Examiner argues that the thickness of a liquid crystal material is typically 1 to 6 microns. Thus, the Examiner argues that a protrusion having a height of 1 micron satisfies the feature of having a height which is at least 10%, 20% or substantially 50% of the thickness of the liquid crystal material.

Applicants respectfully submit, however, that taken in view of the teachings of *Acosta et al.* and *Funada et al.*, neither of the references teach or suggest the claimed invention. *Acosta et al.* and *Funada et al.* are both concerned with alignment layers for affecting alignment at the *surface* of a liquid crystal layer. The present invention, on the other hand, is concerned with affecting alignment within the *bulk* of a liquid crystal layer. Thus, the present invention calls for at least one alignment layer having protrusions with a height which is *at least 10% of the thickness* of the liquid crystal as recited in claim 1.

More specifically, the teachings of *Acosta et al.* and *Funada et al.* must be taken in context. The mesogen layer of *Acosta et al.* is employed to change the alignment of the *surface* of the liquid crystal layer due to the anisotropic molecular structure of the mesogen protrusions. (See, e.g., Col. 1, lns. 27-29, "[t]he alignment layers 2,2' create

parallel alignment of the liquid crystal molecules in the liquid crystal layer 3 at its *boundaries* with the alignment layers 2,2'''. (Emphasis added). In contrast, the construction of micro-grooves in *Funada et al.* is to change the angle of the *surface* of the liquid crystal layer. (See, e.g., Fig. 1).[1] Therefore, *Acosta et al.* and *Funada et al.* teach different ways of aligning the liquid crystal. Those skilled in the art would not combine them.

In any case, *Acosta et al.* nor *Funada et al.* teach or suggest an alignment layer having protrusions with a height which is *at least 10% of the thickness* of the liquid crystal as recited in claim 1. For example, *Funada et al.*, upon which the Examiner relies, describes the protrusions as being a "*micro-groove*" structure. This means that the micro-groove structures are intended to be relatively very small. Else, the term would be meaningless.

Applicants agree with the Examiner in that *Funada et al.* teaches micro-grooves having a depth up to 1 micron (see e.g., column 2, lines 61-66). Specifically, *Funada et al.* describes micro-grooves as having a depth in the range of 10 Å to 10,000 Å. However, the particular examples given in *Funada et al.* refer only to micro-grooves having a depth in the range of 10 Å and 1000 Å, or merely one-tenth to one-hundredth of the upper limit of 10,000 Å. Applicants respectfully submit that *Funada et al.* utilizes micro-grooves having a depth in the range of 10 Å and 1000 Å because such depths are substantially more in line with typical thicknesses of the liquid crystal layer. While *Funada et al.* teaches an upper limit of 10,000 Å, there is nothing to teach or suggest that a depth of 10,000 Å would be used for anything other than an unusually thick liquid crystal layer such that the alignment layer still would lack protrusions with a height which is *at least 10% of the thickness* of the liquid crystal as recited in claim 1.

In other words, there is no teaching or suggestion in *Acosta et al.* or *Funada et al.* of a protrusion height to liquid crystal thickness ratio which is anything other than conventional. As stated above, the conventional approach in the prior art including both

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[1]While Fig. 6 of *Funada et al.* illustrates a homogeneous orientation of the liquid crystal molecules, this is the result of the application of the electric field.

Acosta et al. and *Funada et al.* was to provide an alignment layer which affected the alignment at the surface of the liquid crystal layer, and not the bulk liquid crystal layer. *Funada et al.* teaches micro-grooves having a depth up to 10,000 Å, but such teaching alone is not enough. Neither *Funada et al.* nor *Acosta et al.* teach or suggest that micro-grooves having such a depth would be used for anything other than achieving the conventional goal of affecting the alignment of the liquid crystal layer at its surface. One having ordinary skill in the art would not have been prompted to utilize an unusually deep micro-groove with a liquid crystal layer of typical thickness in order to affect the bulk of the liquid crystal layer as in the present invention. Again, there is no teaching or suggestion in the prior art to do so.

Hence, any argument to the contrary is a result of impermissible hindsight. Applicants' own application cannot be used simply as a blueprint to combine references. There must be some teaching or suggestion to combine the references so as to result in the particular protrusion height to liquid crystal thickness ratio as claimed. Thus, the rejection should be withdrawn.

Furthermore, claim 3 recites the feature where the protrusions have a height which is at least 20% of the thickness of the liquid crystal. Claim 4 recites the feature where the protrusions have a height which is substantially 50% of the thickness of the liquid crystal. *Funada et al.*, with its upper limit of 10,000 Å, does not teach or suggest the recited percentages as it does not teach or suggest the corresponding thickness of the liquid crystal layer. The burden is on the Examiner to produce a reference or references that teach or suggest such percentages. Absent any such teachings, the rejection must be withdrawn.

IV. REJECTION OF CLAIMS 11 AND 18 UNDER 35 USC §103(a)

Claims 11 and 18 stand rejected under 35 USC § 103(a) based on *Acosta et al.* in view of *Funada et al.*, and further in view of *Ulrich et al.* Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claims 11 and 18 each depend from claim 1 either directly or indirectly, and can be distinguished over *Acosta et al.* and *Funada et al.* for at least the same reasons.

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Moreover, *Ulrich et al.* does not make up for the above-discussed deficiencies in *Acosta et al.* and *Funada et al.* Thus, withdrawal of the rejection is respectfully requested.

V. CONCLUSION

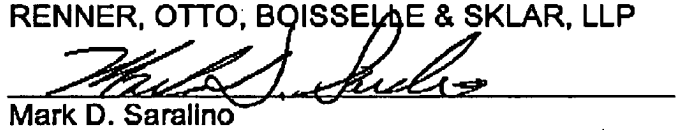
Accordingly, all claims are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP



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